



#4

1

SEQUENCE LISTING

<110> PLOWMAN, GREGORY D.
MARTINEZ, RICARDO
WHYTE, DAVID
MANNING, GERARD
SUDARSANAM, SUCHA
CAENEPEEL, SEAN
HILL, RON
FLANAGAN, PETER

<120> MAMMALIAN PROTEIN PHOSPHATASES

<130> 038602/1180

<140> 09/866,987

<141> 2001-05-30

<150> 60/208,291

<151> 2000-05-30

<160> 17

<170> PatentIn Ver. 2.1

<210> 1

<211> 1026

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
phosphatase nucleotide

<400> 1

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cagcgtgggg	acttccttgc	caggcccagt	gagagcagcc	cgggggggctt	cacgctgtcc	120
gtcagagagg	cccttgggga	gggtcattg	agtcaggggc	tcagcaggac	cctttcctcc	180
cctgtgaggg	ccctggggac	aggcagggcc	tccgtggctg	cgaccgtgtt	gccagagcct	240
gggggtgcag	ctggggagtg	cagcgggggtt	cccattgagc	tctggtacct	gctgggctgc	300
caggacccc	cggttgagtg	gtggtaccac	gggcgcctgt	ctggcaagga	ggctgagaag	360
ctgctgtgc	agaaggggca	tccgggcagc	tccctgggtg	acatgagtca	gagcgatcct	420
gggggcttcc	cgctgtcagc	gctgacgcaa	gggtgggacg	aggcgcaggg	ctcaggccgc	480
cagccacagg	tcacgcacat	catgactcac	tcccagggtg	gagggggcgg	cgagctgggg	540
cggcctctgg	gaagggcggg	cggccttggc	caggcccctc	accgccaccc	ccacggccgg	600
atgagaagtc	tctccctgca	gcccctcaag	gccacgagga	tcagtgtctg	gagcctggag	660
ggctgtgtgc	aggagagcag	ggccactgat	gccagcggga	aggccaggca	gggcttctgg	720
gtggagttca	agatgctgca	gcagcaggaa	tgccggttcc	tgtacctctg	gaaggagggg	780
cagagtgtgg	agaacaagcc	caagaatcac	tacaagaaca	tccttccctg	tgagggcgga	840
ggccagggcg	tcaccgctcg	ggcctggggg	agggcctcgc	gggcgcaggg	tgtacatcgc	900
ctgcagggct	gtctgcaggc	ctgtctgcag	gccacgggtg	ctgcttctctg	ggccacgggtg	960
caccaggaga	acacgcgtgt	catcgtcatg	accaccaggg	agatggagcg	gggcccgggtg	1020
gggggtg						1026

<210> 2

<211> 800

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
phosphatase nucleotide

<400> 2

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gctccgaggc cgccggggccc tcctccagag tcccgccagt ccccagagt ccaggccagt 60
ccccgccgtc acccggtgcg aaccgcgag aggcctagt cagctggcag ccccgccccg 120
gcacccgcct gctcttctcg cgggtccgga ccgcgagcgc gggggccgac gggtcgccgc 180
tgcgccgggc cgggatggcg gccaccgcgc tgctggaggc cggcctggcg cgggtgctct 240
tctacccgac gctgctctac accctgttcc gcgggaaggt gccgggtcgg gcgcaccggg 300
actggtacca ccgcacgcac cccaccgtgc tgctgggcgc gctgccgttg cggagcttga 360
cgcgccagct ggtacaggac gagaacgtgc gcgggtgat caccatgaac gaggagtacg 420
agacgaggtt cctgtgcaac tcttcacagg agtgggaagag actaggagtc gacgagctgc 480
ggctcagcac agtagacatg actgggatcc ccaccttga caacctccag aagggagtcc 540
aatgtgctct caagtaccag tcgctgggcc agtgtgttta cgtgcattgt aaggctgggc 600
gctccaggag tgccactatg gtggcagcat acctgattca ggtgcacaaa tggagtccag 660
aggaggctgt aagagccatc gccaaagatcc ggtcatacat ccacatcagg cctggccagc 720
tggatgttct taaagagttc cacaagcaga ttactgcacg ggcaacaaag gatgggactt 780
ttgtcatttc aaagacatga                                     800

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<210> 3

<211> 1380

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
phosphatase nucleotide

<400> 3

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ccgcctgggc cgcacgccag ccccgctgcc taccgacggc cccgcttcc tccgggctcc 120
agctccagcc ccggggcggc cgacgcctcg cccgcccag actcccgcc cgtgcgcagc 180
cccgcacgag gacgcacgct accctggaat gcaggctacg ccgagattat caatgcagag 240
aaatctgaat tcaatgagga tcaagccgcc tgtgggaagc tgtgcatccg gagatgtgag 300
tttggggctg aagaagagtg gctgaccctg tgcccagagg agttcctgac aggccattac 360
tgggcaactg tcgatgggca cggcggtcct gcagcagcca tcttggtgc caacacctg 420
cactcctgct tgcgccggca gctggaggcc gtggtggaag gcttggtggc cactcagccc 480
cccatgcacc tcaatggccg ctgcatctgc cccagtgacc ctcagtttgt ggaggaaaag 540
ggcatcaggg cagaagactt ggtgatcggg gcattggaga gtgcctttca ggaatgtgat 600
gaggatgatc ggccgggagct ggaggcctca ggccagatgg gcggtgcac agccctggtg 660
gctgtgtccc tgcagggaac gctgtacatg gccaatgctg gggatagcag ggccatcttg 720
gtgcggagag atgagatacg gccactgagc ttcgagttca cccagagac tgagcggcag 780
cggatccagc agctggcctt tgtctatcct gagcttcttg ctggtgagtt cacccgactg 840
gagttccctc ggccggctgaa gggggatgac ttgggacaga aggttttgtt cagggatcac 900
cacatgagtg gctggagcta caaacgtgtg gagaaatcgg atctcaagta cccactgatc 960
catggacagg gtaggcaggc tcggttacta ggaacactgg ctgtctccc gggcctggga 1020
gaccatcagc tcagagtcct ggacacaaac atccagctca agcccttctt gctctctgtg 1080
ccacaggtga ctgtgctgga tgtggaccag ctggagctac aggaggatga tgtggttgtc 1140
atggcaactg atggactctg ggatgtactg tccaacgagc aggtggcatg gctggtgcgg 1200
agcttccctc ctgggaacca agaggaccca cacaggttct caaagctggc ccagatgctg 1260
atacacagca cacagggaaa ggaagacagt ctcacagagg aagggcaggt gtccctacgat 1320
gacgtctctg tgttcgtgat tcccttgca agtcagggcc aagagagcag tgaccactga 1380

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<210> 4
 <211> 1164
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 phosphatase nucleotide

<400> 4

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atgagagcgt ggatccctgg gtgggttggg cggccgcacg ggggtgccga ggcgtctggg 60
ggcctgcgct tcggggcgag cgcagcgcaa ggctggcgcg cgcgcatgga ggatgctcac 120
tgcacttggc tttcgttacc tggctctgcc cggggttggg ccttgtttgc cgtcctcgac 180
ggccacgggtg gggctcgagc tgcccgcttc ggtgcacgcc atttgccagg ccattgtgctc 240
caggagctgg gcccgagacc tagcgagccc gagggcgctgc gcgaggcgct gcgccgagcc 300
ttcttgagcg ccgacgagcg ccttcgctcc ctctggcccc gcgtggaaac gggcggttcc 360
acggccgtag tgttgctggt ctccccgcgg tttctgtacc tggcgactg cgggtgactcc 420
cgcgcggtgc tgagccgcgc tggcgccgtg gccttcagca cagaggacca ccggccccctt 480
cgaccccggg aacgcgagcg catccacgcc gctggcgcca ccattccgccc ccgcgcgctc 540
gagggctctc tggccgtgtc gcgagcggtg ggcgacttta cctacaagga ggctccgggg 600
agggcccccg agctacagct cgtttctgcg gagccagagg tggccgcact ggcacgccag 660
gctgaggacg agttcatgct cctggcctct gatggcgtct gggacactgt gtctggtgct 720
gccctggcgg gactggtggc ttcacgcctc cgcttgggcc tggccccaga gcttctctgc 780
gcgcagctgt tggacacgtg tctgtgcaag ggcagcctgg acaacatgac ctgcattctg 840
gtctgcttcc ctggggcccc taggccttct gaggagcgga tcaggaggga gctagcactg 900
gacgcagccc tgggctgcag aatcgctgaa ctgtgtgcct ctgctcagaa gccccccagc 960
ctgaacacag ttttcaggac tctggcctca gaggacatcc cagatttacc tcctggggga 1020
gggctggact gcaaggccac tgtcattgct gaagtttatt ctcatatctg ccaggtctca 1080
gaagagtgcg gagagaaggg gcaggatggg gctgggaagt ccaacccac gcatttgggc 1140
tcagccttgg acatggaggc ctga                                     1164

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<210> 5
 <211> 429
 <212> DNA
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 phosphatase nucleotide

<400> 5

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ttaggtaatg tgcaagcagt cttatgcaga aatgggaaag gtttttgctt aaccaaagaa 60
catactacac gaaacacaaa tgaaagaaga agaatacttc agaatggagc agtcattagt 120
tcaaataaac catacgggct ttagaggggg caagtaaaaa ctacacgagg acttggtattt 180
catggaaatc tcaagctgaa aaaatccatt atcccagcac ctcaaactat ttctgtccct 240
atagatgacc tatgtcaatt ccttattgta gctactaatg gactttggga agttttggat 300
aaagaggaag ttgatgtggc aacaaatgaa aaagaatcag acactaagag tttctatgaa 360
ggcgagctg agtatgttag ccatgaactt gtaaagtctg ctttactggc tggctccaga 420
gacaacatt

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<210> 6
 <211> 342
 <212> PRT
 <213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
phosphatase polypeptide

<400> 6

Arg	Trp	Phe	His	Pro	Asn	Ile	Ser	Arg	Val	Glu	Ala	Glu	Lys	Leu	Phe
1				5					10					15	
Leu	Ser	Arg	Gly	Gln	Arg	Gly	Asp	Phe	Leu	Ala	Arg	Pro	Ser	Glu	Ser
			20					25					30		
Ser	Pro	Gly	Gly	Phe	Thr	Leu	Ser	Val	Arg	Glu	Ala	Leu	Gly	Glu	Gly
		35					40					45			
Ser	Leu	Ser	Gln	Gly	Leu	Ser	Arg	Thr	Leu	Ser	Ser	Pro	Val	Arg	Ala
	50					55					60				
Leu	Gly	Thr	Gly	Arg	Ala	Ser	Val	Ala	Ala	Thr	Val	Leu	Pro	Glu	Pro
65					70					75					80
Gly	Gly	Ala	Ala	Gly	Glu	Cys	Ser	Gly	Val	Pro	Ile	Glu	Leu	Trp	Tyr
				85					90					95	
Pro	Leu	Gly	Cys	Gln	Asp	Pro	Ala	Leu	Glu	Trp	Trp	Tyr	His	Gly	Arg
		100						105					110		
Leu	Ser	Gly	Lys	Glu	Ala	Glu	Lys	Leu	Leu	Leu	Gln	Lys	Gly	His	Pro
		115					120					125			
Gly	Ser	Phe	Leu	Val	His	Met	Ser	Gln	Ser	Asp	Pro	Gly	Gly	Phe	Pro
	130					135					140				
Leu	Ser	Ala	Leu	Thr	Gln	Gly	Trp	Asp	Glu	Ala	Gln	Gly	Ser	Gly	Arg
145					150					155					160
Gln	Pro	Gln	Val	Thr	His	Ile	Met	Thr	His	Ser	Gln	Val	Gly	Gly	Gly
				165					170					175	
Gly	Glu	Leu	Gly	Arg	Pro	Leu	Gly	Arg	Ala	Gly	Gly	Leu	Gly	Gln	Ala
		180						185					190		
Pro	His	Arg	His	Pro	His	Gly	Arg	Met	Arg	Ser	Leu	Ser	Leu	Gln	Pro
		195					200					205			
Leu	Lys	Ala	Thr	Arg	Ile	Ser	Ala	Arg	Ser	Leu	Glu	Gly	Cys	Val	Gln
	210					215					220				
Glu	Ser	Arg	Ala	Thr	Asp	Ala	Ser	Gly	Lys	Ala	Arg	Gln	Gly	Phe	Trp
225					230					235					240
Val	Glu	Phe	Lys	Met	Leu	Gln	Gln	Gln	Glu	Cys	Arg	Phe	Leu	Tyr	Pro
				245					250					255	
Arg	Lys	Glu	Gly	Gln	Ser	Val	Glu	Asn	Lys	Pro	Lys	Asn	His	Tyr	Lys
			260					265					270		
Asn	Ile	Leu	Pro	Cys	Glu	Gly	Gly	Gln	Gly	Val	Thr	Arg	Arg	Ala	
		275					280					285			

Trp Gly Arg Ala Ser Arg Ala Gln Gly Val His Arg Leu Gln Gly Cys
 290 295 300

Leu Gln Ala Cys Leu Gln Ala Thr Val Ala Ala Phe Trp Ala Thr Val
 305 310 315 320

His Gln Glu Asn Thr Arg Val Ile Val Met Thr Thr Arg Glu Met Glu
 325 330 335

Arg Gly Arg Val Gly Val
 340

<210> 7

<211> 201

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 phosphatase polypeptide

<400> 7

Met Ala Ala Thr Ala Leu Leu Glu Ala Gly Leu Ala Arg Val Leu Phe
 1 5 10 15

Tyr Pro Thr Leu Leu Tyr Thr Leu Phe Arg Gly Lys Val Pro Gly Arg
 20 25 30

Ala His Arg Asp Trp Tyr His Arg Ile Asp Pro Thr Val Leu Leu Gly
 35 40 45

Ala Leu Pro Leu Arg Ser Leu Thr Arg Gln Leu Val Gln Asp Glu Asn
 50 55 60

Val Arg Gly Val Ile Thr Met Asn Glu Glu Tyr Glu Thr Arg Phe Leu
 65 70 75 80

Cys Asn Ser Ser Gln Glu Trp Lys Arg Leu Gly Val Glu Gln Leu Arg
 85 90 95

Leu Ser Thr Val Asp Met Thr Gly Ile Pro Thr Leu Asp Asn Leu Gln
 100 105 110

Lys Gly Val Gln Phe Ala Leu Lys Tyr Gln Ser Leu Gly Gln Cys Val
 115 120 125

Tyr Val His Cys Lys Ala Gly Arg Ser Arg Ser Ala Thr Met Val Ala
 130 135 140

Ala Tyr Leu Ile Gln Val His Lys Trp Ser Pro Glu Glu Ala Val Arg
 145 150 155 160

Ala Ile Ala Lys Ile Arg Ser Tyr Ile His Ile Arg Pro Gly Gln Leu
 165 170 175

Asp Val Leu Lys Glu Phe His Lys Gln Ile Thr Ala Arg Ala Thr Lys
 180 185 190

Asp Gly Thr Phe Val Ile Ser Lys Thr
 195 200

<210> 8

<211> 459

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 phosphatase polypeptide

<400> 8

Met Ser Ala Gly Trp Phe Arg Arg Arg Phe Leu Pro Gly Glu Pro Leu
 1 5 10 15

Pro Ala Pro Arg Pro Pro Gly Pro His Ala Ser Pro Val Pro Tyr Arg
 20 25 30

Arg Pro Arg Phe Leu Arg Gly Ser Ser Ser Ser Pro Gly Ala Ala Asp
 35 40 45

Ala Ser Arg Arg Pro Asp Ser Arg Pro Val Arg Ser Pro Ala Arg Gly
 50 55 60

Arg Thr Leu Pro Trp Asn Ala Gly Tyr Ala Glu Ile Ile Asn Ala Glu
 65 70 75 80

Lys Ser Glu Phe Asn Glu Asp Gln Ala Ala Cys Gly Lys Leu Cys Ile
 85 90 95

Arg Arg Cys Glu Phe Gly Ala Glu Glu Glu Trp Leu Thr Leu Cys Pro
 100 105 110

Glu Glu Phe Leu Thr Gly His Tyr Trp Ala Leu Phe Asp Gly His Gly
 115 120 125

Gly Pro Ala Ala Ala Ile Leu Ala Ala Asn Thr Leu His Ser Cys Leu
 130 135 140

Arg Arg Gln Leu Glu Ala Val Val Glu Gly Leu Val Ala Thr Gln Pro
 145 150 155 160

Pro Met His Leu Asn Gly Arg Cys Ile Cys Pro Ser Asp Pro Gln Phe
 165 170 175

Val Glu Glu Lys Gly Ile Arg Ala Glu Asp Leu Val Ile Gly Ala Leu
 180 185 190

Glu Ser Ala Phe Gln Glu Cys Asp Glu Val Ile Gly Arg Glu Leu Glu
 195 200 205

Ala Ser Gly Gln Met Gly Gly Cys Thr Ala Leu Val Ala Val Ser Leu
 210 215 220

Gln	Gly	Lys	Leu	Tyr	Met	Ala	Asn	Ala	Gly	Asp	Ser	Arg	Ala	Ile	Leu	225	230	235	240
Val	Arg	Arg	Asp	Glu	Ile	Arg	Pro	Leu	Ser	Phe	Glu	Phe	Thr	Pro	Glu	245	250	255	
Thr	Glu	Arg	Gln	Arg	Ile	Gln	Gln	Leu	Ala	Phe	Val	Tyr	Pro	Glu	Leu	260	265	270	
Leu	Ala	Gly	Glu	Phe	Thr	Arg	Leu	Glu	Phe	Pro	Arg	Arg	Leu	Lys	Gly	275	280	285	
Asp	Asp	Leu	Gly	Gln	Lys	Val	Leu	Phe	Arg	Asp	His	His	Met	Ser	Gly	290	295	300	
Trp	Ser	Tyr	Lys	Arg	Val	Glu	Lys	Ser	Asp	Leu	Lys	Tyr	Pro	Leu	Ile	305	310	315	320
His	Gly	Gln	Gly	Arg	Gln	Ala	Arg	Leu	Leu	Gly	Thr	Leu	Ala	Val	Ser	325	330	335	
Arg	Gly	Leu	Gly	Asp	His	Gln	Leu	Arg	Val	Leu	Asp	Thr	Asn	Ile	Gln	340	345	350	
Leu	Lys	Pro	Phe	Leu	Leu	Ser	Val	Pro	Gln	Val	Thr	Val	Leu	Asp	Val	355	360	365	
Asp	Gln	Leu	Glu	Leu	Gln	Glu	Asp	Asp	Val	Val	Val	Met	Ala	Thr	Asp	370	375	380	
Gly	Leu	Trp	Asp	Val	Leu	Ser	Asn	Glu	Gln	Val	Ala	Trp	Leu	Val	Arg	385	390	395	400
Ser	Phe	Leu	Pro	Gly	Asn	Gln	Glu	Asp	Pro	His	Arg	Phe	Ser	Lys	Leu	405	410	415	
Ala	Gln	Met	Leu	Ile	His	Ser	Thr	Gln	Gly	Lys	Glu	Asp	Ser	Leu	Thr	420	425	430	
Glu	Glu	Gly	Gln	Val	Ser	Tyr	Asp	Asp	Val	Ser	Val	Phe	Val	Ile	Pro	435	440	445	
Leu	His	Ser	Gln	Gly	Gln	Glu	Ser	Ser	Asp	His						450	455		

<210> 9

<211> 387

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
phosphatase polypeptide

<400> 9

Met	Arg	Ala	Trp	Ile	Pro	Gly	Trp	Val	Gly	Arg	Pro	His	Gly	Gly	Ala	1	5	10	15
Glu	Ala	Ser	Gly	Gly	Leu	Arg	Phe	Gly	Ala	Ser	Ala	Ala	Gln	Gly	Trp	20	25	30	
Arg	Ala	Arg	Met	Glu	Asp	Ala	His	Cys	Thr	Trp	Leu	Ser	Leu	Pro	Gly	35	40	45	
Leu	Pro	Pro	Gly	Trp	Ala	Leu	Phe	Ala	Val	Leu	Asp	Gly	His	Gly	Gly	50	55	60	
Ala	Arg	Ala	Ala	Arg	Phe	Gly	Ala	Arg	His	Leu	Pro	Gly	His	Val	Leu	65	70	75	80
Gln	Glu	Leu	Gly	Pro	Glu	Pro	Ser	Glu	Pro	Glu	Gly	Val	Arg	Glu	Ala	85	90	95	
Leu	Arg	Arg	Ala	Phe	Leu	Ser	Ala	Asp	Glu	Arg	Leu	Arg	Ser	Leu	Trp	100	105	110	
Pro	Arg	Val	Glu	Thr	Gly	Gly	Phe	Thr	Ala	Val	Val	Leu	Leu	Val	Ser	115	120	125	
Pro	Arg	Phe	Leu	Tyr	Leu	Ala	His	Cys	Gly	Asp	Ser	Arg	Ala	Val	Leu	130	135	140	
Ser	Arg	Ala	Gly	Ala	Val	Ala	Phe	Ser	Thr	Glu	Asp	His	Arg	Pro	Leu	145	150	155	160
Arg	Pro	Arg	Glu	Arg	Glu	Arg	Ile	His	Ala	Ala	Gly	Gly	Thr	Ile	Arg	165	170	175	
Arg	Arg	Arg	Val	Glu	Gly	Ser	Leu	Ala	Val	Ser	Arg	Ala	Leu	Gly	Asp	180	185	190	
Phe	Thr	Tyr	Lys	Glu	Ala	Pro	Gly	Arg	Pro	Pro	Glu	Leu	Gln	Leu	Val	195	200	205	
Ser	Ala	Glu	Pro	Glu	Val	Ala	Ala	Leu	Ala	Arg	Gln	Ala	Glu	Asp	Glu	210	215	220	
Phe	Met	Leu	Leu	Ala	Ser	Asp	Gly	Val	Trp	Asp	Thr	Val	Ser	Gly	Ala	225	230	235	240
Ala	Leu	Ala	Gly	Leu	Val	Ala	Ser	Arg	Leu	Arg	Leu	Gly	Leu	Ala	Pro	245	250	255	
Glu	Leu	Leu	Cys	Ala	Gln	Leu	Leu	Asp	Thr	Cys	Leu	Cys	Lys	Gly	Ser	260	265	270	
Leu	Asp	Asn	Met	Thr	Cys	Ile	Leu	Val	Cys	Phe	Pro	Gly	Ala	Pro	Arg	275	280	285	
Pro	Ser	Glu	Glu	Ala	Ile	Arg	Arg	Glu	Leu	Ala	Leu	Asp	Ala	Ala	Leu	290	295	300	

Gly Cys Arg Ile Ala Glu Leu Cys Ala Ser Ala Gln Lys Pro Pro Ser
305 310 315 320

Leu Asn Thr Val Phe Arg Thr Leu Ala Ser Glu Asp Ile Pro Asp Leu
325 330 335

Pro Pro Gly Gly Gly Leu Asp Cys Lys Ala Thr Val Ile Ala Glu Val
340 345 350

Tyr Ser Gln Ile Cys Gln Val Ser Glu Glu Cys Gly Glu Lys Gly Gln
355 360 365

Asp Gly Ala Gly Lys Ser Asn Pro Thr His Leu Gly Ser Ala Leu Asp
370 375 380

Met Glu Ala
385

<210> 10

<211> 143

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
phosphatase polypeptide

<400> 10

Leu Gly Asn Val Gln Ala Val Leu Cys Arg Asn Gly Lys Gly Phe Cys
1 5 10 15

Leu Thr Lys Glu His Thr Thr Arg Asn Thr Asn Glu Arg Arg Arg Ile
20 25 30

Leu Gln Asn Gly Ala Val Ile Ser Ser Asn Glu Pro Tyr Gly Leu Val
35 40 45

Glu Gly Gln Val Lys Thr Thr Arg Gly Leu Gly Phe His Gly Asn Leu
50 55 60

Lys Leu Lys Lys Ser Ile Ile Pro Ala Pro Gln Thr Ile Ser Val Pro
65 70 75 80

Ile Asp Asp Leu Cys Gln Phe Leu Ile Val Ala Thr Asn Gly Leu Trp
85 90 95

Glu Val Leu Asp Lys Glu Glu Val Asp Val Ala Thr Asn Glu Lys Glu
100 105 110

Ser Asp Thr Lys Ser Phe Tyr Glu Gly Ala Ala Glu Tyr Val Ser His
115 120 125

Glu Leu Val Asn Ala Ala Leu Leu Ala Gly Ser Arg Asp Asn Ile
130 135 140

<210> 11
 <211> 57
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<220>
 <221> modified_base
 <222> (57)
 <223> a, g, c, or t

<400> 11
 aagcagtggg aacaacgcag agtacttttt tttttttttt tttttttttt tttttvn 57

<210> 12
 <211> 30
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 12
 aagcagtggg aacaacgcag agtacgcggg 30

<210> 13
 <211> 30
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Primer

<400> 13
 aagtggcaac agagataacg cgtacgcggg 30

<210> 14
 <211> 18
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 Oligonucleotide

<400> 14
 ttgcggagct tgacgcgc 18

<210> 15
 <211> 19
 <212> DNA
 <213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
Oligonucleotide

<400> 15
tcccatcctt tgttgcccg 19

<210> 16
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 16
ggagctgtcg tattccagtc 20

<210> 17
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer

<400> 17
aaccctcaa gaccgttta g 21